

THE STATUS OF MONGOOSES (FAMILY: HERPESTIDAE) IN RUHUNA NATIONAL PARK, SRI LANKA¹

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(With two text-figures)

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Three species of mongoose occur in Ruhuna National Park, namely *Herpestes edwardsii*, *H. smithii* and *H. vitticollis*. They are mostly solitary and diurnal carnivores that inhabit a variety of habitats ranging from moist riverine forests to arid open grasslands. Ninety-six individuals were recorded from 86 observations, during a transect study carried out between October 1991 and September 1993, in which a total of 34 days were spent in Block I (141 sq. km) of the Park. The most conspicuous and abundant species is the ruddy mongoose (*H. smithii*), while the grey mongoose (*H. edwardsii*) is rare. The stripe-necked mongoose (*H. vitticollis*) is the largest species associated with moist areas. The mongooses were found to be active throughout the day, but had two peaks of activity: a major one in the morning (0800 hrs) and a minor one in the late evening (1700 hrs). It is estimated that there could be at least a minimum of 370 ruddy mongoose, 100 stripe-necked mongoose and 30 grey mongoose in Block I, giving a crude density of 2.6, 0.7 and 0.2 per sq. km respectively. The sympatric occurrence of these three species of small carnivores underlines the ecological richness and diversity of the Park.

INTRODUCTION

Of the 12 species of mongoose that belong to the genus *Herpestes* worldwide, 4 occur in Sri Lanka, namely the Indian grey mongoose (*Herpestes edwardsii*), ruddy mongoose (*H. smithii*), Indian brown mongoose (*H. fuscus*) and stripe-necked or badger mongoose (*H. vitticollis*). All but the brown mongoose occur in the Ruhuna National Park. Mongooses were at one time included under the family Viverridae, but subsequently assigned a separate family, Herpestidae by Pocock (1939). The presence of distinct herpestine and viverrine fossils in the lower and mid-Miocene of Europe indicates that these two groups might have diverged from one another very early (Petter 1969). Herpestids are long-bodied, short-legged, terrestrial carnivores characterized by highly developed anal scent glands (Corbet and Hill 1992). They are never blotched or spotted, and their coats are normally grizzled and coarse in texture (Kingdon 1977).

Another peculiarity is that in all Asian *Herpestes*, the males have one chromosome less than the females: $2n = 35$ in males, and 36 in females (Fredga 1972). Petter (1969), on the basis of tooth structure has shown the genus *Herpestes* to be the least modified from the primitive miacid-type carnivore from which the viverrids and herpestids had evolved.

Mongooses occupy a variety of habitats ranging from densely forested hills to open arid areas. They usually live in holes in the ground or hollow trees. They seldom climb trees (Lekagul and McNeely 1977). They are known to prey on snakes, even venomous ones such as the cobra (*Naja naja*). While mongooses are less sensitive than most mammals to snake venom, they are not completely immune to it (Prater 1971). Mongooses being predominantly diurnal, are a common feature of the wildlife seen in the national parks in Sri Lanka. Nevertheless, there has been no attempt at serious research on mongoose in Sri Lanka, and much of what is known about their biology is still derived from the observations of Eisenberg and Lockhart (1972), and Phillips (1984). Hence, this

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preliminary study was undertaken to obtain information on the diversity, abundance and activity of mongooses in the Ruhuna National Park, given the need to know their current status, if measures aimed at their conservation are to be appropriate and effective.

STUDY AREA

The observations on mongooses were carried out in Block I (141 sq. km) of the Ruhuna National Park (1,268 sq. km), situated on the southeast coast of Sri Lanka (Fig. 1). Block I is characterized by a large number of freshwater tanks (man-made ponds and lakes), and brackish lagoons. The main vegetation cover is woody, mostly thorn-scrub, where the canopy is below 5 m in height, but forest trees occur in clumps within the scrub, and as continuous cover inland from the coast (Mueller-Dombois 1972). The Park lies in a transition zone between the single wet season experienced on the east coast and the double peak of precipitation found along the south coast of the island (IUCN 1990). The mean annual temperature is 27 °C, and the main dry season extends from May to September. The Park receives less than 1,000 mm of rain per year. For details regarding the flora and fauna of the Park see Balasubramaniam *et al.* (1980), and Santiapillai *et al.* (1981).

MATERIAL AND METHODS

Block I has a good network of motorable roads, designed to take visitors past all the major water-holes and grazing grounds. Between October 1991 and September 1993, 34 days were spent observing the mongooses in the Park. Observations were carried out twice a day between 0630 hrs and 1830 hrs, along the network of roads, starting from the Palatupana bungalow near the Park entrance to the Yala bungalow in the north, along the coast, passing most of the water-holes and grasslands and from

there back to Palatupana via Heenwewa through largely scrub and forest. An area of approximately 14 sq. km was intensively searched for mongooses (Fig. 1). Most of the animals were recorded as they crossed the road. In open grasslands, and around water-holes, they were recorded from larger areas, due to clear visibility. At every sighting, the species was identified and its number, locality, habitat, time and activity recorded. All observations were made with the naked eye or a pair of 8 x 40 binoculars, from a vehicle driven at about 7 km per hour.

RESULTS AND DISCUSSION

A total of 94 mongooses were recorded during 86 observations. Of the three species of mongoose in the Park, the grey mongoose (*Herpestes edwardsii*) was the least common with only 3 individuals, recorded on two occasions (Table 1). Of the other two species, 13 stripe-necked or badger mongoose (*H. vitticollis*) were observed on 12 occasions. The ruddy mongoose (*H. smithii*) was the most conspicuous and numerically abundant species in the Park with 78 recordings. It is surprising that the brown mongoose (*H. fuscus*) which is so common along the southwest coast of Sri Lanka up to Tangalle, does not occur in the Park.

Herpestes smithii

The ruddy mongoose identified easily in the field by its black-tipped, upwardly pointed tail, is one of the most successful and adaptable small carnivores in the Ruhuna National Park. It occupies a wide variety of habitats such as thorn-scrub, forest, coastal sand dunes, and the 'villu' grasslands. While in Wilpattu National Park it is reportedly associated with permanent water (Eisenberg and Lockhart 1972), in Ruhuna National Park, it inhabits a variety of habitats and is not exclusively associated with water-

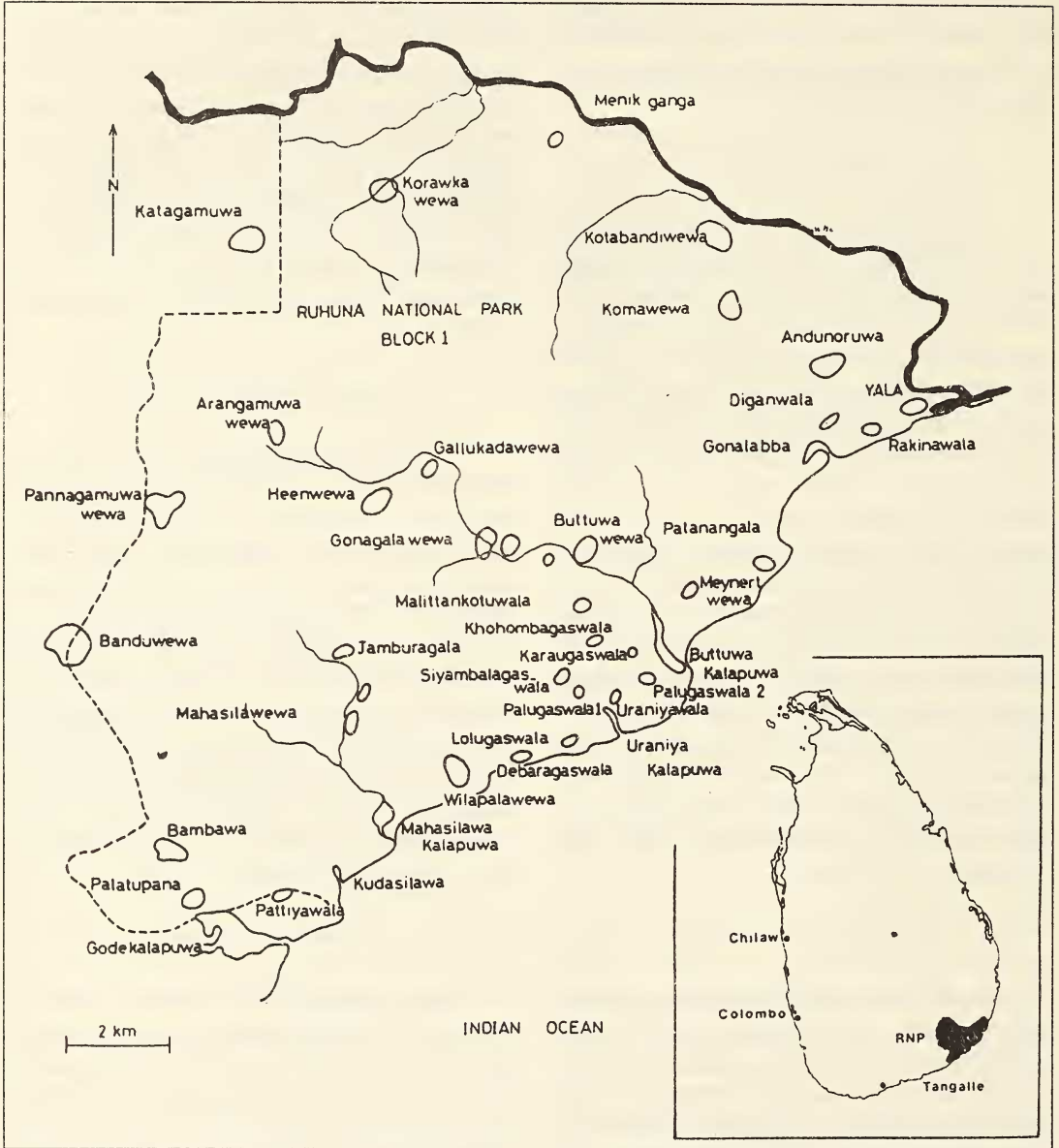


Fig. 1: Map of Block I of Ruhuna National Park (RNP), Sri Lanka showing the location of the main water-holes.

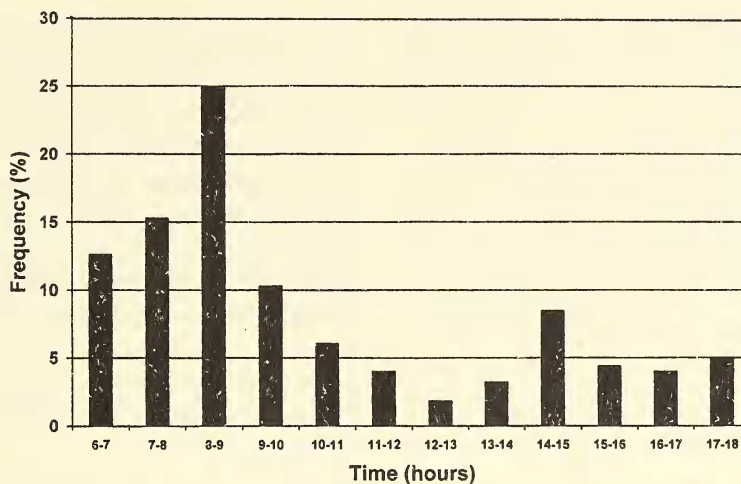


Fig. 2: Frequency of mongooses sighted per unit time period at different hours.

TABLE I
SPECIES DIVERSITY AND ABUNDANCE OF
MONGOOSES IN RUHUNA NATIONAL PARK

Species	<i>H. edwardsii</i>	<i>H. smithii</i>	<i>H. vitticollis</i>	Total
October 1991	-	3	1	4
January 1992	-	18	2	20
March 1992	2	12	5	19
June 1992	-	4	-	4
January 1993	1	7	1	9
March 1993	-	14	4	18
April 1993	-	2	-	2
September 1993	-	18	-	18
Total	3	78	13	94

sq. km respectively. The ruddy mongoose is an effective and audacious predator that forages alone, never in a group. For food and feeding habits see Phillips (1984) and Prater (1971).

Herpestes vitticollis

holes. Observations point to its essentially solitary nature; 92% of the animals observed were solitary, while pairs accounted for 8%. The pairs observed were adult males and females. No young were seen during the survey. The ruddy mongoose appears to have a restricted home range, within which it usually follows the same route. The size of its range depends on habitat and prey availability. In East Africa, Taylor (1970) estimated the range of the slender mongoose (*H. sanguineus*) to be about 1 sq. km, while in Hawaii, Tomich (1969) estimated the range of the male and female small Indian mongoose (*H. auropunctatus*) to be 2.0 and 0.5

The stripe-necked or badger mongoose, readily identified by its characteristic black neck-stripe, is the largest of all mongooses in Asia. Essentially a forest animal, rarely encountered far from water. All the observations of this species were made in moist areas and in the vicinity of the River Menik Ganga. It is the most solitary among all species of mongoose. The only stable social unit consists of the mother and her offspring. Although the badger mongoose can be encountered at any time of the day, it appears to be most active in the early hours between 0700-0900 hrs. It is catholic in its diet. According to Phillips (1984), it takes not only small mammals and large prey like the black-naped hare (*Lepus nigricollis*), mouse deer (*Tragulus meminna*) and jungle fowl (*Gallus lafayetti*), but also freshwater crabs, frogs, and fish that occur in swamps or slow moving streams. Ramachandran (1985) has recorded this

mongoose scavenging a tiger kill. The mongoose can be seen examining the river banks and other damp areas for crabs and frogs (Table 2).

TABLE 2
FOOD PREFERENCES OF THE MONGOOSES IN
RUHUNA NATIONAL PARK

Food items	<i>H. smithii</i>	<i>H. edwardsii</i>	<i>H. vitticollis</i>
root	-	+	-
fruits	-	+	-
berries	-	+	-
carriion	+	+	-
termites	-	+	-
beetles	-	+	+
grubs	-	+	+
snails	+	-	-
lizards	+	+	+
snakes	+	+	+
ground birds	+	+	+
bird's eggs	+	+	+
jungle fowl	-	-	+
rats	+	+	+
mice	+	+	+
shrew	+	+	+
mouse deer	-	-	+
hare	-	-	+
freshwater crabs	-	-	+
freshwater fish	-	-	+
frogs	-	-	+
Total	9	14	15

Source: Phillips (1984), and information from Park authorities (+ indicates an item eaten by the species)

Herpestes edwardsii

The grey mongoose is identified by its silver-grey, pepper-and-salt speckled pelage and the whitish tip (never black) of its long tail. It is associated with open areas, cultivated fields, grasslands and scrub, but not forest (Prater 1971). It is mostly solitary and diurnal. Active, particularly in the early mornings between 0800 and 0900 hrs, it tends to use tracks and is often seen crossing the roads. The normal gait is a quick trot. A cautious animal, it moves constantly, examining the surroundings for food. It is often seen in close proximity to termite mounds, which are plentiful across much of the

Park. Termite adults are not an important food item, but larval forms are preferred on account of their high fat content. The grey mongoose appears to rely on larger prey such as ground birds and their eggs, lizards, small snakes, insects, grubs and to a lesser extent, fruits, berries and roots (Phillips 1984). In India, it has been observed to chase the hare (*Lepus nigricollis*) and run away with a dead cattle egret (*Bubulcus ibis*) that had been left to lure Indian foxes out of the den (Johnsingh 1978). It will kill and devour any small snake. It was also observed digging into water buffalo dung in search of beetles and termites.

Activity pattern

Mongoose are solitary predators that hunt by day and by night, and can be seen crossing the road at any time of the day. Fig. 2 represents the frequency of mongooses (all three species) sighted per unit time period at different hours. 25% of the sightings were between 0800 and 0900 hrs, while over 50% of the sightings were made between 0600 and 0900 hrs. They were mostly encountered in and around the water-holes. About 80% of the observations in the Park were made in the 'villu' grasslands around the water-holes.

The mongooses are diurnal in Ruhuna National Park. There are essentially two peaks of activity: a large one in the morning at about 0800 hrs and another small one late in the evening about 1700 hrs. These two peaks of activity refer to foraging and hunting; mongooses hunt actively during early morning and late evening. The early morning activity coincides with the basking time of most small reptiles, such as lizards and snakes. The period of diurnal activity is interrupted by one or more short resting periods. In southwest Spain, Palomares and Delibes (1993) found that the Egyptian mongoose (*H. ichneumon*), which is also diurnal devotes about 75% of its daytime to resting. At mid-day, most of the mongooses retreat into the forest or

near the river to escape the heat. The usual sleeping and resting areas are the termitaries and other natural crevices in the rocky areas of the Park which afford protection from the largest predator, the leopard (*Panthera pardus*), and from inclement weather. Given that underground dens and thickets fulfill both requirements, Palomares and Delibes (1993) recommend that habitats having such dens and thickets should be protected to guarantee the conservation of mongooses.

Number and Density

On the basis of the restricted home ranges of mongooses, and their association with water-holes, we estimate that at least 37 ruddy mongoose, 10 badger mongoose and 3 grey mongoose reside within the area covered by the transect, which amounts to roughly 14 sq. km, bearing thorn-scrub vegetation that is typical of the Park. This translates into a population of 370 ruddy mongoose, 100 badger mongoose, and 30 grey mongoose, in Block I (141 sq. km) of the Ruhuna National Park, giving crude density values of 2.6, 0.7 and 0.2 per sq. km for the three species respectively. These density values must be treated with extreme caution, as they were based on the animals observed in the transect, and not on any rigorous mark-release-recapture study. In any case, they represent the minimum crude densities of the three species in the Park. In Puerto Rico, the density of the small Indian mongoose (*H. auropunctatus*) in sugarcane plantations (where it was introduced to kill snakes) became as high as 250 per sq. km (Piementel 1955). At such high density, the mongoose became a pest. But in the wild, mongooses do not occur in high densities. Eisenberg and Lockhart (1972), observed the

ruddy mongoose (*H. smithii*) to be the most numerous species in Wilpattu National Park, in northwest Sri Lanka. The same appears to be true for Block I of the Ruhuna National Park, in southeast Sri Lanka. It is interesting to note that although both Parks support only three species of mongoose, they occur in different combinations: *H. smithii*, *H. edwardsii* and *H. fuscus* in Wilpattu, and *H. smithii*, *H. edwardsii* and *H. vitticollis* in Ruhuna. The stripe-necked mongoose replaces the brown mongoose in Ruhuna. Furthermore, while *H. fuscus* is the rarest of the three species in Wilpattu (Eisenberg and Lockhart, 1972), in Ruhuna, *H. edwardsii* is the least common.

CONCLUSION

The biological richness and diversity of Block I of Ruhuna National Park is reflected by the number of carnivore species it supports. The fact that three species of mongoose are sympatric in the area, points to the existence of a much larger community of animals supporting them.

Of the three species, the most abundant and conspicuous is the ruddy mongoose. The three species are catholic in their diet and appear to have restricted home ranges. All three species appear active during the day and may extend their activity period to the evenings as well. The three species of mongoose are legally protected in Sri Lanka. The principal threat to them comes from the use of toxic agro-chemicals in farming areas that surround the protected areas. Strictly controlled use of such poisons in and around livestock areas, particularly near wildlife reserves, is needed. At the same time, in areas of high predation by mongooses, the losses should be offset by some sort of compensation by the Department of Wildlife Conservation to ensure that man and mongoose coexist peacefully.

REFERENCES

BALASUBRAMANIAM, S., CH. SANTIAPILLAI & M.R. CHAMBERS (1980): Seasonal shifts in the pattern of habitat

utilisation by the spotted deer *Axis axis* (Erxleben, 1777) in the Ruhuna National Park, Sri Lanka.

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- Spixiana* 3: 157-166.
- CORBET, G.B. & J.E. HILL (1992): The Mammals of the Indomalayan Region: A systematic review. Oxford University Press, Oxford.
- EISENBERG, J.F. & M. LOCKHART (1972): An ecological reconnaissance survey of Wilpattu National Park, Ceylon. *Smithsonian Contributions to Zoology* 101: 1-118.
- FREDGA, K. (1972): Comparative chromosome studies in mongooses, I. *Hereditas* 71: 1-74.
- IUCN (1990): IUCN Directory of South Asian Protected Areas, IUCN, Gland.
- JOHNSINGH, A.J.T. (1978): Some aspects of the ecology and behaviour of the Indian Fox — *Vulpes bengalensis* (Shaw). *J. Bombay nat. Hist. Soc.* 75: 397-405.
- KINGDON, J. (1977): East African Mammals. An Atlas of Evolution in Africa. Volume III A. Carnivores. Academic Press, London.
- LEKAGUL, B. & J.A. MCNEELY (1977): Mammals of Thailand. Association for the Conservation of Wildlife, Bangkok, Thailand.
- MUELLER-DOMBOIS, D. (1972): Crown distortion and elephant distribution in the woody vegetations of Ruhuna National Park, Ceylon. *Ecology* 53(2): 208-226.
- PALOMARES, F. & M. DELIBES (1993): Resting ecology and behaviour of Egyptian mongooses (*Herpestes ichneumon*) in southwestern Spain. *J. Zool. Lond.* 230: 557-506.
- PETTER, G. (1969): Interpretation evolutive des caracteres de la denture des viverrides africains. *Mammalia* 33: 607-625.
- PHILLIPS, W.W.A. (1984): Manual of the Mammals of Ceylon. Wildlife & Nature Protection Society, Colombo. 2nd edn.
- PIEMENDEL, D. (1955): Biology of the Indian mongoose in Puerto Rico. *J. Mammal* 36: 62-68.
- POCOCK, R.I. (1939): The Fauna of British India: Mammalia. Primates and Carnivora. London.
- PRATER, S.H. (1971): The Book of Indian Animals. Oxford University Press, Bombay.
- RAMACHANDRAN, K.K. (1985): A note on the scavenging behaviour of stripe-necked mongoose on Tiger's kill. *J. Bombay nat. Hist. Soc.* 82: 182-193.
- SANTIAPILLAI, CH., M.R. CHAMBERS & S. BALASUBRAMANIAM (1981): A preliminary study of bark damage by cervids in the Ruhuna National Park, Sri Lanka. *Spixiana* 4(3): 247-254.
- TAYLOR, M. (1970): Locomotion in some East African viverrids. *J. Mammal.* 51: 42-51.
- TOMICH, P.Q. (1969): Movement patterns of the mongoose in Hawaii. *J. Wildl. Manage.* 33: 576-584.

